

WHAT IS CLAIMED IS:

- 1 1. A crossbar for providing connections between a plurality
2 of ports and a plurality of system agents via a processing system comprising:
3 a plurality of ports, each port capable of being an input port
4 customized for receiving data from a source agent and an output port
5 customized for transferring data to a destination agent; and,
6 crossbar control data for specifying crossbar control information
7 for transferring data from an input port to an output port having different port
8 configurations.
- 1 2. The crossbar according to claim 1 wherein the data
2 received on the input port further comprises control data for indicating validity
3 and destination information relating to data received on the input port.
- 1 3. The crossbar according to claim 1 further comprising at
2 least one register on each input port and each said output port for storing data
3 in memory.
- 1 4. The crossbar according to claim 1 further comprising at
2 least one shift register on each input port for storing data in memory and
3 shifting data with larger bit length to a smaller bit length data for transmission
4 from an input port with more width to an output port with less width.
- 1 5. The crossbar according to claim 1 further comprising at
2 least one multiplexor device on each said input port and each said output port
3 for prioritizing transmissions of data.
- 1 6. The crossbar according to claim 1 wherein an input port
2 and an output port of at least one of said plurality of ports are customized to
3 have different widths.

1 7. The crossbar according to claim 1 wherein a plurality of
2 said input ports are customized to have different width.

1 8. The crossbar according to claim 1 wherein a plurality of
2 said output ports are customized to have different width.

1 9. The crossbar according to claim 1 wherein said crossbar
2 control data contain control information for formatting bit length of data from
3 an input port to be transmitted to an output port with less width than the input
4 port.

1 10. The crossbar according to claim 1 wherein said crossbar
2 control data contain control information for use by any one from the group of a
3 shift register or a multiplexor device.

1 11. A crossbar having a plurality of paths for providing
2 connections between a plurality of ports and a plurality of system agents via a
3 processing system comprising:

4 a plurality of ports, each port capable of being an input port
5 customized for receiving data from a source agent and an output port
6 customized for transferring data to a destination agent;

7 a plurality of virtual communication channels on each input port;
8 and,

9 crossbar control data for specifying crossbar control information
10 for transferring data from a virtual communication channel to an output port
11 having different configurations.

1 12. A method for transmitting data between customized ports
2 and a plurality of system agents in a processing system via a crossbar, wherein
3 the crossbar includes a plurality of ports, each port capable of being an input
4 port customized for receiving data from a source agent and an output port
5 customized for transferring data to a destination agent, and crossbar control

6 data for specifying crossbar control information for transmitting data from an
7 input port to an output port having different port configurations, the method
8 comprising the steps of:

- 9 receiving data on an input port;
- 10 obtaining the destination output port for the data received on the
- 11 input port;
- 12 determining whether the input port has the same configuration as
- 13 the output port;
- 14 obtaining control information from the crossbar control data
- 15 when the input port does not have the same configurations as the output port;
- 16 processing the data according to the obtained control information
- 17 from the crossbar control data; and,
- 18 transmitting the processed data to the destination output port.

1 13. The method according to claim 12 wherein said step of
2 receiving data further comprises the steps of:

- 3 reading control data received with the data on the input port;
- 4 determining whether the control data have valid port information;
- 5 and,
- 6 aborting when the control data does not have valid port
- 7 information.

1 14. The method according to claim 13 wherein said step of
2 obtaining the destination output port further comprises the step of obtaining the
3 destination output port from the control data when the control data has valid
4 port information.

1 15. The method according to claim 12 wherein said step of
2 processing the data further comprising the steps of:

3 determining whether the width of the input port is more than the
 4 width of the output port;
 5 submitting the data as the processed data when the width of the
 6 input port is not more than the width of the output port;
 7 obtaining the width of the output port when the width of the input
 8 port is greater than the width of the output port;
 9 formatting the data from the input port to data configured for the
 10 obtained width of the output port; and,
 11 submitting the formatted data as the processed data.

1 16. A system for transmitting data between customized ports
 2 and a plurality of system agents in a processing system via a crossbar, wherein
 3 the crossbar includes a plurality of ports, each port capable of being an input
 4 port customized for receiving data from a source agent and an output port
 5 customized for transferring data to a destination agent, and crossbar control
 6 data for indicating crossbar control information for transmitting data from an
 7 input port to an output port having different port configurations, comprising:
 8 a storage medium;
 9 a machine for transmitting data between customized ports and a
 10 plurality of system agents in a processing system via a crossbar, the machine
 11 comprising a set of instructions for:
 12 receiving data on an input port;
 13 obtaining the destination output port for the data received on the
 14 input port;
 15 determining whether the input port has the same configuration as
 16 the output port;
 17 obtaining control information from the crossbar control data
 18 when the input port does not have the same configurations as the output port;

19 processing the data according to the obtained control information
20 from the crossbar control data; and,
21 transmitting the processed data to the destination output port.

1 17. A machine for transmitting data between customized ports
2 and a plurality of system agents in a processing system via a crossbar, the
3 machine comprising a set of instructions to::

4 receive data on an input port;
5 obtain the destination output port for the data received on the
6 input port;

7 determine whether the input port has the same configuration as
8 the output port;

9 obtain control information from the crossbar control data when
10 the input port does not have the same configurations as the output port;

11 process the data according to the obtained control information
12 from the crossbar control data; and,

13 transmit the processed data to the destination output port.